	Application No.	**Applicant(s)**
Notice of Allowability	10/758,630	GOPAL ET AL.
	Examiner	**Art Unit**	
	Kandasamy Thangavelu	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *8 May 2007*.

2. ☒ The allowed claim(s) is/are *1-21*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of
      Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☒ Other *Clean copy of Allowed claims*.

DETAILED ACTION

Introduction

1.   This communication is in response to the Applicants' communication dated May 8, 2007. Claims 1, 3, 9-11, 13, 18 and 19 were amended. Claims 1-21 of the application are pending.

Examiner's Amendment

2.   Authorization for this examiner's amendment was given in a telephone conversation by Mr. John Dahl on July 3, 2007.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3.   In the claims:

Claim 1, Line 7, "computer readable medium"

has been changed to

-- computer readable storage medium --.

Claim 3, Line 2, "process to be modeled"

has been changed to

-- process being modeled --.

Claim 5, Line 2, "assumptions and applied model transformations"

has been changed to

-- assumptions --.

Claim 9, Line 2, "is a flash column"

has been changed to

-- represents a flash column --.

Claim 10, Lines 3-5, "rate of change of the mass of vapor, rate of change of a mass of

liquid, energy change of a vapor, energy change of a liquid, pressure equilibrium correlation,

thermal equilibrium correlation, vapor and liquid enthalpy equations, equal pressure, gas law and

volume correlation"

has been changed to

-- rate of change of a mass of a vapor, a rate of change of a mass of liquid, energy change

of the vapor, energy change of the liquid, pressure equilibrium correlation, thermal equilibrium

correlation, vapor and liquid enthalpy equations, gas law and volume correlation--.

Claim 11, Line 7, "computer readable medium"

has been changed to

-- computer readable storage medium --.

Claim 13, Line 2, "the environment of a process being modeled"

has been changed to

-- an environment of the process being modeled --.

Claim 14, Line 2, "assumptions and applied model transformations"

has been changed to

-- assumptions --.

Claim 18, Lines1-5, "the symbolic generic component comprises representations of

parameters for a flash column selected from the group consisting of a rate of change of the mass

of vapor, rate of change of a mass of liquid, energy change of a vapor, energy change of a liquid,

pressure equilibrium correlation, thermal equilibrium correlation, vapor and liquid enthalpy

equations, equal pressure, gas law, and volume correlation"

has been changed to

-- the symbolic generic model comprises representations of parameters for a flash

column selected from the group consisting of a rate of change of a mass of a vapor, a rate of

change of a mass of liquid, energy change of the vapor, energy change of the liquid, pressure

equilibrium correlation, thermal equilibrium correlation, vapor and liquid enthalpy equations, gas

law, and volume correlation--.

Claim 19, Line 7, "computer readable medium"

has been changed to

-- computer readable storage medium --.

Claim 20, Line 2, "a environment independent"

has been changed to

-- an environment independent --.

Claim 20, Lines 6-7, "representations of the components derived from the generic

models based on the assumptions"

has been changed to

-- representations of the components forming component specific models derived

from the generic models based on the assumptions; and

an output interface for storing the component specific models on a computer

readable storage medium--.

A clean copy of allowed claims is attached.

Reasons for Allowance

4.   Claims 1-21 of the application are allowed over prior art of record.

5.   The following is an Examiner's statement of reasons for the indication of allowable

subject matter:

The closest prior art of record shows:

(1) method and system for visual modeling and dynamic simulation of complex systems

in chemical and biochemical domains; the system comprises libraries of knowledge based

building blocks that include sets of icons representing chemical processes; the values of

parameters are computed by generic formulas; the values of a particular instance of a variable

may be computed by a formula defined in its attribute table; the simulated formulas may contain

algebraic, difference and differential equations; the system enables development of large

knowledge bases, computer models and simulations of chemical and biochemical systems by

domain experts with no programming expertise; the graphical interface allow the experts to

encode modeling and simulation knowledge in sets of icons connected in schematics; the

functional structure of the system is constructed using experimentally obtained qualitative

information; the mathematical component is represented by algebraic and differential equations;

the combination of both allows use of same model for both symbolic and numerical simulations;

the system uses palettes that contain domain specific and generic building blocks to be used by

the modeler and libraries that contain specific models to be used by different types of users

(**Thalhammer-Reyero,** U.S. Patent 5,980,096);

(2) a universal machine translator of arbitrary languages with zero loss of meaning of the source language in the target language translation; the system has means for identifying high level grammatical constructions of a source language word stream, decomposing source and target languages into universal moments of meaning and translating the moments of source and target languages with substantially no loss of meaning; computer graphics are used to represent natural languages in symbolic forms; symbolic languages of mathematics and sciences are also used; a collection of programs are used to generate symbolic forms of language (**Datig**, U.S. Patent Application 2002/0198697);

(3) non-linear process control by constraining the behavior of an empirical non-linear model; the model constrains the behavior of the derivative of the empirical model without affecting the ability of the model to represent generic non-linear relationships; the model is used to build a non-linear controller that uses an optimized model in its prediction of the optimal trajectory to steady state; the techniques may be applied to chemical process modeling, financial forecasting, pattern recognition etc.; the optimized model may be used as one component of a larger model that may use other modeling approaches for other components; the components may be implemented in an online environment where other components may interact with the empirical process being modeled (**Turner et al.**, U.S. Patent Application 2002/0072828); and

(4) a neural network trained with a general set of data to function as a general model of a process with local condition inputs set to zero; the network then receives additional training on

an extended data set containing data on specific local conditions, characterized by non-zero

values for local condition inputs; this results in a neural network which functions as a general

model when local condition input values are zero and as a model of some specific local condition

when local condition values match the local set data (**Hall**, U.S. patent 5,586,033).

Additional state of the art reviewed and considered by the Examiner is found in U.S.

Patent 5,691,895; U.S. Patent 6,076,048; U.S. Patent 5,467,291; U.S. Patent 5,305,221; Shapiro,

B., "Solving the optimal mistuning problem by symmetry: A general framework for extending

flutter boundaries in turbomachines via mistuning", California Institute of Technology, March

1997; Hestenes, D., "Modeling software for learning and doing physics", Arizona state

university, 1996; Motta et al., "Specification of knowledge components for reuse", Eleventh

International conference on Software engineering and Knowledge engineering", 1999; Hamie et

al., "Navigation Expressions in object-oriented modeling", University of Brighton, UK 1998;

Ehrig et al., "Application of category theory to area of algebraic specification in computer

science", Applied categorical structures, 1998; Eborn et al., "ThermoFlow: A Thermo-Hydraulic

library in Modelica", Lund University, Sweden, 2000; Kemmerer, S., "STEP- The Grand

Experience", National Institute of Standards and Technology, July 1999.

None of these references taken either alone or in combination with the prior art of record

discloses a computer implemented method of creating process models, specifically including:

(Claim 1) "selecting a symbolic generic model for a component represented in a

symbolic language;

choosing assumptions about a component to be modeled; and

applying the assumptions to the symbolic generic model to derive a component

specific model reflecting the assumptions".

None of these references taken either alone or in combination with the prior art of record

discloses a system for creating process models, specifically including:

(Claim 11) "means for selecting a symbolic generic model for a component represented

in a symbolic language;

means for choosing assumptions about a component to be modeled;

means for applying the assumptions to the symbolic generic model to derive a component

specific model reflecting the assumptions".

None of these references taken either alone or in combination with the prior art of record

discloses a computer readable medium having instructions for causing a computer to perform a

method of creating process models, specifically including:

(Claim 19) "selecting a symbolic generic model for a component represented in a

symbolic language;

choosing assumptions about a component to be modeled;

applying the assumptions to the symbolic generic model to derive a component specific

model reflecting the assumptions".

None of these references taken either alone or in combination with the prior art of record

discloses a development environment for process modeling, specifically including:

(Claim 20) "a set of generic models, each comprising an environment independent

symbolic representation of a component;

an interface that provides selectable environment specific assumptions for each

component to be modeled; and

a set of environment specific representations of the components forming component

specific models derived from the generic models based on the assumptions".

6.   Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for

Allowance."

7.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is

571-272-3717. The examiner can normally be reached on Monday through Friday from

8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Paul Rodriguez, can be reached on 571-272-3753. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
July 3, 2007

Clean Copy of Allowed Claims

1.   A computer implemented method of creating process models, the method comprising:

selecting a symbolic generic model for a component represented in a symbolic language;

choosing assumptions about a component to be modeled; and

applying the assumptions to the symbolic generic model to derive a component specific model reflecting the assumptions; and

storing the component specific model on a computer readable storage medium.

2.   The method of claim 1 wherein the symbolic generic model comprises symbolic representations that are environment independent.

3.   The method of claim 2 wherein the component specific model reflects an environment of the process being modeled.

4.   The method of claim 1 wherein the symbolic language is selected from the group consisting of Mathematica, Axiom, MAPLE and ADIFOR.

5.   The method of claim 1 and further comprising maintaining a log of assumptions.

6.   The method of claim 1 wherein the symbolic generic model comprises a proper ancestor model.

7.   The method of claim 1 wherein the component specific model comprises a specific environment model.

8.   The method of claim 1 wherein multiple specific models are derived from multiple symbolic generic models corresponding to multiple components in a process or manufacturing facility.

9.   The method of claim 1 wherein the symbolic generic model represents a flash column.

10.   The method of claim 9 wherein the symbolic generic model comprises representations of parameters selected from the group consisting of a rate of change of a mass of a vapor, a rate of change of a mass of liquid, energy change of the vapor, energy change of the liquid, pressure equilibrium correlation, thermal equilibrium correlation, vapor and liquid enthalpy equations, gas law and volume correlation.

11.   A system for creating process models, the system comprising:

means for selecting a symbolic generic model for a component represented in a symbolic language;

means for choosing assumptions about a component to be modeled;

means for applying the assumptions to the symbolic generic model to derive a component specific model reflecting the assumptions; and

means for storing the component specific model on a computer readable storage medium.

12.   The system of claim 11 wherein the symbolic generic model comprises symbolic representations that are environment independent.

13.   The system of claim 12 wherein the component specific model reflects an environment of the process being modeled.

14.   The system of claim 11 and further comprising maintaining a log of assumptions.

15.   The system of claim 11 wherein the symbolic generic model comprises a proper ancestor model.

16.   The system of claim 11 wherein the component specific model comprises a specific environment model.

17.   The system of claim 11 wherein multiple component specific models are derived from multiple symbolic generic models corresponding to multiple components in a process or manufacturing facility.

18. The system of claim 17 wherein the symbolic generic model comprises representations of parameters for a flash column selected from the group consisting of a rate of change of a mass of a vapor, a rate of change of a mass of liquid, energy change of the vapor, energy change of the liquid, pressure equilibrium correlation, thermal equilibrium correlation, vapor and liquid enthalpy equations, gas law, and volume correlation.

19. A computer readable medium having instructions for causing a computer to perform a method of creating process models, the method comprising:

selecting a symbolic generic model for a component represented in a symbolic language;

choosing assumptions about a component to be modeled;

applying the assumptions to the symbolic generic model to derive a component specific model reflecting the assumptions; and

storing the component specific model on a computer readable storage medium.

20. A development environment for process modeling comprising:

a set of generic models, each comprising an environment independent symbolic representation of a component;

an interface that provides selectable environment specific assumptions for each component to be modeled;

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a set of environment specific representations of the components forming

component specific models derived from the generic models based on the

assumptions; and

an output interface for storing the component specific models on a computer

readable storage medium.

21.   The model of claim 1 wherein the assumptions about the component to be

modeled are chosen from a log of assumptions.